

BLISTER RUST CONTROL WORK
MOUNT RAINIER NATIONAL PARK, 1941

By
M. C. Riley
Associate Forester

Ribes eradication on Mount Rainier National Park during the 1941 field season was performed by CCC enrollees from the main camp at Packwood, who worked on the Stevens Canyon area, and by men employed on regular funds, who worked on the Longmire and White River areas. Near the end of the season these latter two camps were combined at White River. A total of approximately 97 men was employed on blister rust control work during the season.

The CCC enrollees working on the Stevens Canyon area started ribes eradication on June 5 and the side camp was discontinued on July 15 due to lack of funds for packing charges, low enrollment, and the ultimate abandonment of the main camp. These men were supervised by an experienced blister rust foreman.

The crews paid from regular funds started work on July 25 at Longmire and on July 28 at White River. Due to inclement weather and the nature of the ground cover the crew at Longmire was moved to White River early in September where work was continued on ribes eradication until October 1. The regular crews were supervised by experienced blister rust foremen who were released from their CCC duties upon the curtailment of that program. A checker was employed until September 1 and his time was very well spent in assisting in the training of men, doing post check work to establish the limits of areas to be eliminated from crew work and in checking the efficiency of the eradication work.

The CCC crew in Stevens Canyon was engaged entirely in second working while the regular crews at Longmire and White River were engaged on both second and third working. The work as programmed was not completed on any of the areas due to a late start with regular funds, much interference from rain on the Longmire area and some hindrance because of forest fires.

At the close of the ribes eradication season the regular crew was assigned to canker elimination work on the Sunrise portion of the White River area. While this cannot be considered as an alternative for ribes eradication, it is felt that much benefit is derived, since the local source of aeciospores is greatly reduced. The work done on the White River area covered the worst infection centers and prevented the unsightly appearance of dead branches without materially hindering tree growth. During the course of this work 776 acres were covered in 247 effective man-days with 21,084 cankers removed from 4,991 trees. It was necessary to remove only four trees because of killing cankers.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and supervise the work. This Bureau also supplied the necessary forms and office supplies for the proper recording and reporting of data. The Chief Ranger was placed in charge of all blister rust work within the park by the Superintendent and this greatly facilitated the more orderly and efficient organization and progress of the program.

For the 1942 season the minimum requirements would be a crew of at least 20 men to spend half of the season doing urgent rework on the White River area and half of the season doing equally urgent rework on the Longmire area. If it is decided to continue rework in the Stevens Canyon area at least 35 additional men will be needed for the entire season.

The following tables show statements of expenditures, results of the field work for 1941, and accumulative results for all work done to date:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1941
MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
National Park Service	Regular	\$8,780.63
	Total	8,780.63
Bureau of Entomology and Plant Quarantine	Regular	829.93
	Wash.-ERA	82.00
	Total	911.93
All Agencies	Total	\$9,692.56

TABLE 1A

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1941
MOUNT RAINIER NATIONAL PARK

Item	National Park Service	Bureau of Entomology and Plant Quarantine			Total
	Regular	Regular	ERA	Total	
Sal. perm. men		\$825.00		\$825.00	\$ 825.00
Sal. temp. men	\$1,525.00				1,525.00
Wages, temp. labs.	6,530.55				6,530.55
Equipment	359.07				359.07
Travel and transp.	48.71	2.58	\$82.00	84.58	133.29
Other supplies	317.30	2.35		2.35	319.65
Total	\$8,780.63	\$829.93	\$82.00	\$911.93	\$9,692.56

TABLE 2

SUMMARY OF RIBES ERADICATION, 1941
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species						Total	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium		Man-Days	Ribes
Stevens Canyon	Second	Stream	42	404	18		30,432				30,450	9.61	725
Longmire	Third	Open Reproduction	42	99	7,819		245		15	257	8,336	2.36	198
		Stream	96	246	6,168		5,389			46	11,603	2.56	121
		All Types	138	345	13,987		5,634		15	303	19,939	2.50	144
White River	Second	Open Pole	280	195		7		15	129	4,504	4,655	.70	17
	Third	Open Pole	959	639	860	2,556		10,274	20	557	14,267	.67	15
	All Workings	Open Pole	1,239	834	860	2,563		10,289	149	5,061	18,922	.67	15
All Areas	Second	Open Pole	280	195		7		15	129	4,504	4,655	.70	17
		Stream	42	404	18		30,432				30,450	9.61	725
		All Types	322	599	18	7	30,432	15	129	4,504	35,105	1.86	109
	Third	Open Reproduction	42	99	7,819		245		15	257	8,336	2.36	198
		Open Pole	959	639	860	2,556		10,274	20	557	14,267	.67	15
		All Upland	1,001	738	8,679	2,556	245	10,274	35	814	22,603	.74	23
		Stream	96	246	6,168		5,389			46	11,603	2.56	121
		All Types	1,097	984	14,847	2,556	5,634	10,274	35	860	34,206	.90	31
	All Workings	Open Reproduction	42	99	7,819		245		15	257	8,336	2.36	198
		Open Pole	1,239	834	860	2,563		10,289	149	5,061	18,922	.67	15
		All Upland	1,281	933	8,679	2,563	245	10,289	164	5,318	27,258	.73	21
		Stream	138	650	6,186		35,821			46	42,053	4.71	305
		All Types	1,419	1,583	14,865	2,563	36,066	10,289	164	5,364	69,311	1.12	49

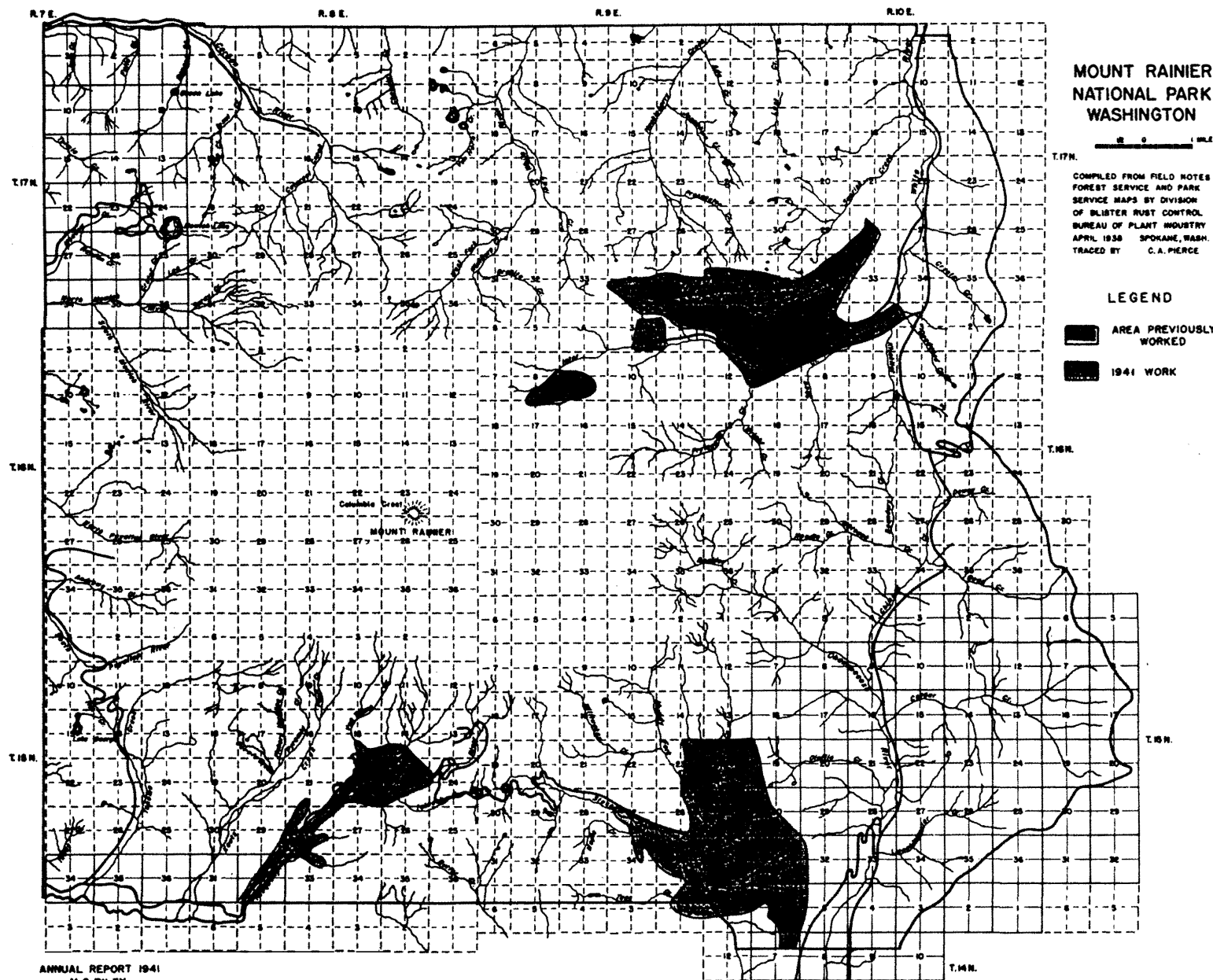
TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1941
MOUNT RAINIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	2,647	3,806	780,171	1.44	295
	NP-CCC	5,607	6,264	860,336	1.12	154
	Total	8,254	10,070	1,640,507	1.22	199
Second	NP-Reg.	318	267	14,310	.84	45
	NP-CCC	4,262	5,372	381,518	1.26	90
	Total	4,580	5,639	395,828	1.23	86
Third	NP-Reg.	1,097	984	34,206	.90	31
	NP-CCC	1,091	1,056	51,313	.97	47
	Total	2,188	2,040	85,519	.93	39
All Workings	NP-Reg.	4,062	5,057	828,687	1.24	204
	NP-CCC	10,960	12,692	1,293,167	1.16	118
	Total	15,022	17,749	2,121,854	1.18	141

TABLE 4
SUMMARY OF RIBES ERADICATION, 1930-1941
MOUNT RAINIER NATIONAL PARK

Working	Area	Eradication Type	Acres	Effective Man-Days	Ribes by Species								Total Ribes	Per Acre Basis	
					lacustris	viscosissimum	bracteosum	waianianum	laxiflorum	acerifolium	sanguineum	triste		Man-Days	Ribes
First	Longaire	Open Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192
		Stream	626	1,202	185,687		97,774		53,899	2,838	16		340,214	1.92	543
		All Types	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.79	436
		Open Reproduction	2,351	218	26,071		15,986				7,915		51,972	.09	22
	Stevens Canyon	Open Pole	704	38	176		1,052				15		1,244	.05	2
		All Upland	3,055	256	28,347		17,038				7,931		53,215	.08	17
		Stream	1,132	4,741	72,360	2,055	440,388		914	11	11,890		519,585	3.98	436
		All Types	4,247	4,997	100,607	2,055	457,424		914	11	11,890		572,501	1.18	135
	White River	Open Reproduction	66	50	6,869		239	1,133	550	194			9,006	.76	136
		Open Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Open Mature	332	264	27,327	12,847			6	45			40,224	.82	125
		All Upland	2,268	2,401	207,975	82,615	650	140,371	1,744	11,040	91	744	445,141	1.06	197
	Starbo	Stream	423	744	182,855	1,510	4,853	242	8,820	188	98	8	178,501	1.78	422
		All Types	2,681	3,145	370,832	84,125	5,429	140,613	10,554	11,228	189	752	623,732	1.17	233
		Open Reproduction	48	21	68	7				2,305			2,387	.44	50
		Open Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133
	All Areas	All Upland	380	283	11,344	6,138		6,730	3,221	18,983			45,396	.74	122
		Stream	46	46	2,653	575		478	545	409			4,582	1.00	102
		All Types	426	329	14,007	6,713		7,308	3,767	19,372			51,065	.77	120
		Open Reproduction	2,789	686	75,289	246	17,108	1,140	5,959	8,303	7,915		115,960	.25	42
Second	Longaire	Open Pole	2,906	2,387	185,232	75,660	1,591	145,961	4,410	27,459			441,164	.82	152
		All Upland	5,957	3,337	287,848	88,733	13,593	147,101	10,374	36,807	8,022	744	597,348	.56	100
		Stream	2,287	6,743	423,555	4,140	543,022	718	64,179	3,446	4,073	8	1,043,159	2.94	456
		All Types	8,254	10,070	711,414	92,893	561,728	147,819	74,553	39,283	12,095	752	1,640,507	1.22	199
	Stevens Canyon	Open Reproduction	208	97	9,744		1,101						10,845	.48	53
		Stream	614	526	19,977		23,136		2,394	1,426	50		47,043	.86	77
		All Types	817	623	29,721		24,297		2,394	1,426	50		57,888	.76	71
		Stream	787	2,532	49,131	95	171,224				607		221,067	3.22	281
	White River	Open Reproduction	66	12	221			77					298	.18	5
		Open Pole	2,194	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.81	37
		Open Mature	322	47	1,278	2,011							3,289	.15	10
		All Upland	2,522	1,827	37,743	16,315	2,176	6,941	16,224	4,537			81,269	.70	34
	All Areas	Stream	324	324	32,743	2,154							32,743	1.67	84
		All Types	2,976	2,484	70,531	16,315	2,330	6,941	16,224	4,537			116,883	.83	39
		Open Reproduction	269	109	9,965		1,101	77					11,143	.41	41
		Open Pole	2,194	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.81	37
Third	Longaire	Open Mature	322	47	1,278	2,011							3,289	.15	10
		All Upland	2,785	1,924	47,527	16,315	3,277	6,941	16,224	4,537			94,821	.69	34
		Stream	1,795	3,715	101,855	95	134,874	2,829		1,426	657		301,007	2.07	168
		All Types	4,580	5,639	149,383	16,410	197,851	6,941	18,623	5,963	657		395,828	1.23	66
	Stevens Canyon	Open Reproduction	42	99	7,819		245		15	257			8,336	2.36	198
		Stream	489	472	15,619		6,562		216	46	6		22,549	.97	46
		All Types	531	571	23,438		6,809		331	303	6		30,885	1.08	58
		Stream	220	551	712		23,384						24,036	2.50	110
	White River	Open Pole	959	639	860	2,556			10,274	20	567		14,267	.67	15
		Stream	478	279	13,281	2,553	34		703				16,271	.58	34
		All Types	1,437	918	14,141	4,809	34	10,274	723	557			30,538	.64	21
		Open Reproduction	42	99	7,819		245		15	257			8,336	2.36	198
	All Areas	Open Pole	959	639	860	2,556			10,274	20	567		14,267	.67	15
		All Upland	1,001	738	8,679	2,554	245		10,274	35	814		22,603	.74	23
		Stream	1,187	1,302	29,512	2,253	29,980		1,019	46	6		32,916	1.10	53
		All Types	2,188	2,040	38,291	4,809	30,225	10,274	1,064	860	6		85,519	.93	39
All Workings	Longaire	Open Reproduction	519	593	57,844		2,447		5,424	6,061			71,776	1.14	138
		Stream	1,729	2,300	221,283		127,632		56,609	4,310	72		409,806	1.27	237
		All Types	2,248	2,793	279,127		129,979		62,033	10,391	72		481,582	1.24	214
		Open Reproduction	2,351	218	26,071		15,986				7,915		51,972	.09	22
	Stevens Canyon	Open Pole	704	38	176		1,052				15		1,244	.05	2
		All Upland	3,055	256	28,347		17,038				7,931		53,215	.08	17
		Stream	2,789	7,884	122,203	2,130	434,324		914	11	4,565		764,838	3.56	348
		All Types	5,254	8,080	150,450	2,130	568,032		914	11	12,497		818,064	1.54	152
	White River	Open Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70
		Open Pole	5,023	4,494	210,924	86,389	2,715	156,376	17,433	15,895	91	744	490,567	.89	98
		Open Mature	644	311	28,605	14,858			5	45			45,513	.48	68
		All Upland	5,799	4,867	245,619	101,486	2,735	167,586	17,988	16,134	91	744	643,384	.84	94
	Starbo	Stream	1,295	1,680	208,885	3,753	5,067	242	9,528	188	98	8	227,769	1.30	176
		All Types	7,094	6,547	455,504	105,249	7,793	157,828	27,516	16,322	189	752	771,153	.92	109
		Open Reproduction	48	21	68	7				2,305			2,387	.44	50
		Open Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133
	All Areas	All Upland	380	283	11,344	6,138		6,730	3,221	18,983			45,396	.74	122
		Stream	46	46	2,653	575		478	545	409			4,582	1.00	102
		All Types	426	329	14,007	6,713		7,308	3,767	19,372			51,065	.77	120
		Open Reproduction	3,050	894	93,073	246	18,454	1,217	5,974	8,560	7,915		135,439	.29	44
	All Areas	Open Pole	6,059	4,794	222,376	92,520	3,767	163,099	20,654	32,553	107	744	535,820	.79	88
		Open Mature	844	311	28,605	14,858			5	45			45,513	.48	68
		All Upland	9,783	5,999	344,054	107,624	22,221	164,316	26,633	41,168	8,022	744	714,772	.82	93
		Stream	5,287	11,750	855,084	6,488	787,583	718	67,897	4,918	4,735	8	1,507,082	2.23	267
		All Types	15,022	17,749	899,088	114,112	789,804	165,034	94,230	46,075	12,768	752	2,121,854	1.18	141



BLISTER RUST CONTROL WORK, GLACIER NATIONAL PARK, 1941

By

M. C. Riley

Associate Forester

Ribes eradication for the control of white pine blister rust on Glacier National Park during the 1941 field season was a continuation, on a very small scale, of the work started during 1939.

Accomplishments were far short of the planned program for the season due to the reduction in the number of CCC camps in the park, lack of enrollees in the camps that were occupied, and because none of the regular funds were made available to this park. No checker was employed this season since the small amount of work done would not justify the expense. The area worked was given a random inspection by qualified men.

Infected white pine were found for the first time on Glacier National Park. The infection consisted of a total of six cankers on three suppressed western white pine north of the road which extends around the head of Lake McDonald. None of the cankers had reached the fruiting stage. Although considerable scouting was done in the immediate vicinity, no other infected trees were found. Because the majority of trees on the area are difficult to inspect due to their height, it is quite possible that more infection exists here than was found. White pine and ribes were examined on all of the other areas in the park where ribes eradication work has been started but no other infection was found.

The only blister rust control work done in the park this season was accomplished by CCC enrollees from one of the camps located at Belton and was a continuation of the first working program started on this area in 1939. Initial ribes eradication has not as yet been completed here. Approximately 25 enrollees were used for about three weeks in June under the supervision of an experienced blister rust foreman.

At the suggestion of Park Service officials the names of two of the areas have been changed. Hereafter the area formerly called Belton will be known as the Park Headquarters Area, and Roes Creek will be known as the East Glacier Area.

In connection with the blister rust control work in Glacier National Park during the 1941 field season, the Bureau of Entomology and Plant Quarantine expended \$470.27 for salaries, travel and supervisory time.

RECOMMENDATIONS

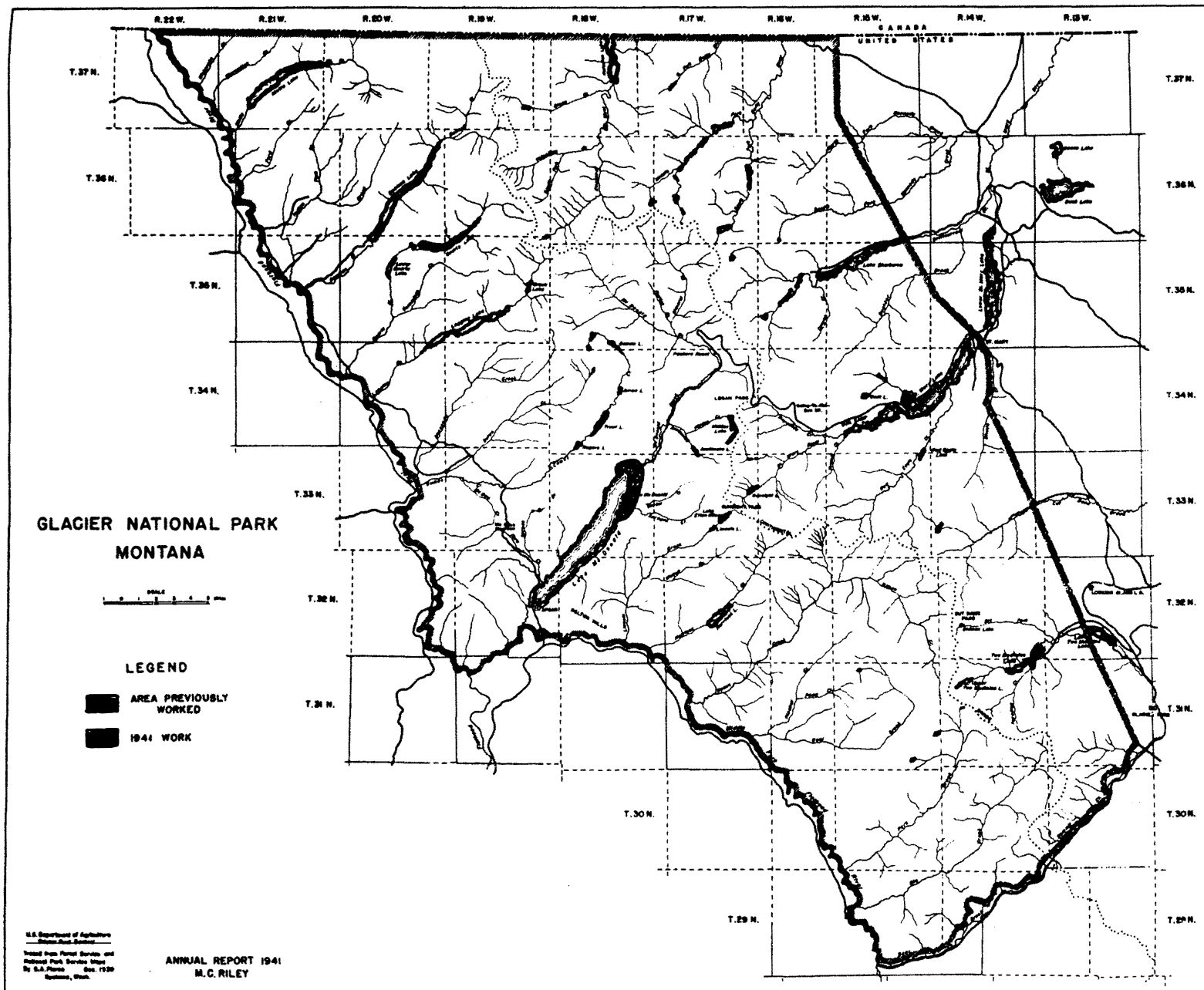
Since initial ribes eradication has been completed on only one of the four areas it is imperative that positive action be taken during 1942 in order to realize the advantage of work already done. In addition to furnishing the initial working on the selected areas, there is now considerable rework needed on every area and in some cases this phase of the program is at least one year behind schedule. On none of the areas where work has been started is it considered that the complete acreage is on a maintenance basis.

TABLE 1
SUMMARY OF RIBES ERADICATION, 1941
GLACIER NATIONAL PARK

Area	Eradication Type	Acres	Effective Man-Days	Ribes by Species			Total Ribes	Per Acre Basis	
				Ribes lacustre	Ribes viscosissimum	Ribes setosum		Man-Days	Ribes
Lake McDonald	Open Mature	54	34	154	347	360	861	.63	16
	Stream	6	17	553		1,602	2,155	2.83	359
	All Types	60	51	707	347	1,962	3,016	.65	50

TABLE 2
SUMMARY OF RIBES ERADICATION, 1939-1941
GLACIER NATIONAL PARK

Area	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
				Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
Park Headquarters	Open Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Open Pole	284	122	13,428	15,364	8,967		37,759	.43	133
	Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
	All Types	681	445	32,708	43,176	32,986		108,870	.65	160
Two Medicine	Open Pole	346	389	16,774	2,573	1,723	2,853	23,923	1.12	69
	Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
	All Upland	406	507	20,709	3,623	6,388	4,687	35,407	1.25	87
	Stream	49	464	28,325	434		12,315	41,074	9.47	838
	All Types	455	971	49,034	4,057	6,388	17,002	76,481	2.13	168
Lake McDonald	Open Mature	683	744	17,255	3,948	29,230		50,433	1.09	74
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,400	884	20,447	4,027	29,557		54,031	.63	39
	Stream	11	39	5,184	35	1,602		6,821	3.54	620
	All Types	1,411	923	25,631	4,062	31,159		60,852	.65	43
East Glacier	Open Pole	86	494	24,077	5,650	6,738	41,173	77,638	5.74	903
All Areas	Open Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Open Pole	716	1,005	54,279	23,587	17,428	44,026	139,320	1.40	195
	Open Mature	683	744	17,255	3,948	29,230		50,433	1.09	74
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
	Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
	All Upland	2,573	2,330	97,941	56,476	75,569	45,860	275,946	.91	107
	Stream	60	503	33,509	469	1,602	12,315	47,895	8.38	798
	All Types	2,633	2,833	131,450	56,945	77,271	58,175	323,841	1.08	123



SCOUTING FOR BLISTER RUST IN YELLOWSTONE NATIONAL PARK
AND ADJACENT AREAS, 1941

By
Edward L. Joy, Forester

In order to keep a close check on the spread of blister rust into the white-bark (Pinus albicaulis), and limber pine (P. flexilis) stands of northwestern Wyoming and adjacent Montana, this general region was scouted in July and August, 1941. Major efforts were placed on areas within Yellowstone and Grand Teton National Parks in which the establishment of control on selected areas is planned for the near future. Additional scouting was performed on areas bordering the parks with special emphasis placed on National Forest lands adjacent to the northwest corner of the Yellowstone. This included careful coverage of the Bear Creek drainage on the Gallatin National Forest where ribes infection only 19 miles from the park boundary was found in 1937.

Although thousands of Ribes petiolare bushes and several hundred whitebark and limber pine trees growing in major drainages of the area were examined, no blister rust was found. This includes inspection in drainages in which solid and continuous clumps of R. petiolare and closely associated five-needle pines occur for distances up to several miles. In addition to this excellent association of the most susceptible species of wild ribes and pines known, moisture and wind current conditions in these drainages are particularly favorable for the development and spread of the disease.

The 1941 season of potential rust spread into this region, which probably extended from May to September, was exceptionally wet. Rains fell during much of each month with unusually heavy downpours very common. It was probably because of the extent and severity of these storms and the accompanying prevention of air-current spore dissemination over long distances that there was very little if any rust spread southeastward from the heavy north Idaho pine infection centers. This abundant precipitation could also be a deterrent to shorter distance spread such as within a drainage or between adjacent drainages but probably such local spread would not be as completely stopped since favorable periods occur between storms. The fact that no rust could be found under conditions that probably were quite favorable for local spread leads to the conclusion that centers of spore-producing pine infection are either very few in number or totally absent in the region scouted.

These results are interpreted to mean that the northwestern Wyoming and adjacent Montana forests still represent the rust invasion front with the strong likelihood that the next zone, in which rust intensification is taking place, lies to the northwest somewhere in Montana. From the fact that ribes infections were quite readily found in the Bitterroot and Wise River ranges of the Beaverhead National Forest during 1937, it is probable that these districts now harbor centers of mature pine infection and fall into this zone. If this is true, the nearest source of spores for spread to Yellowstone National Park is now less than 100 miles or only about one-half the distance from the nearest north Idaho centers.

PREERADICATION SURVEY OF SELECTED AREAS
IN GRAND TETON NATIONAL PARK, 1941

By
Edward L. Joy, Forester

Grand Teton National Park was first given consideration with respect to white pine blister rust control work in 1934 when a preliminary survey of five-needle or white pines and ribes on forested areas in Colorado and Wyoming was made. As a result of that work this park was included as one of the forest units with white pines of considerable value as recreational and watershed area cover. The total area of land with the better stands of these pines was at that time estimated to be about 2,000 acres.

The probability of rust invasion in the northwestern Wyoming five-needle pine stands, based on the discovery of the disease nearby in 1937 and the knowledge that not many years can pass before considerable infection will result, made it advisable to plan for the early establishment of control on Grand Teton National Park areas. For this purpose a partial preeradication survey of the park areas was conducted in 1941 by technicians of the Bureau of Entomology and Plant Quarantine. Although a complete report on this work has been prepared and submitted to the National Park Service, the major points are herein recorded.

AREAS SURVEYED

In the main, Grand Teton National Park is a wilderness area reached only by trails through deep-cut canyons, up steep, rugged slopes, and along high ridges. Consequently those areas of five-needle pines that are immediately adjacent to these trails are of primary importance and were designated for first attention. At the same time the importance of "front slope" stands, or those on the east-facing slopes which constitute the upper-elevation timber cover visible from the main highway through Jackson Hole, was sufficient to justify their inclusion for consideration. With this as a guide inspection or sample stripping to secure basic information for control estimates was accomplished for all areas designated. Due to the fact that all living accommodations are on the Jackson Hole Valley floor, travel time to the areas is considerable and unusually wet weather prevailed, it was possible to give the areas only extensive coverage in the time allowable. However sufficient data for preliminary estimates of the initial eradication or first working were secured for ten areas. Estimates on rework are not made at this time but this phase of the project for all areas will probably require at least 50 per cent of the initial working time.

The ten areas surveyed are as follows:

- | <u>Trail-Side Areas</u> | <u>Front-Slope Areas</u> |
|-----------------------------------|--------------------------|
| 1. Glacier Trail | 1. East Horn |
| 2. Death Canyon-Teeter Ridge | 2. Paintbrush to Cascade |
| 3. Alaska Basin (Targhee N. F.) | 3. Cascade to Glacier |
| 4. South Fork of Cascade Creek | 4. Garnet to Avalanche |
| 5. North Fork of Cascade Creek | |
| 6. Paintbrush Canyon - Holly Lake | |

FIVE-NEEDLE PINES

Although both Pinus albicaulis, whitebark pine, and P. flexilis, limber pine, occur in the park, the former is more abundant and is the principal species of all ten areas. In the lower elevations where P. flexilis occurs, it is a minor associate of other conifers which together would provide an adequate timber cover without the limber pine. In the higher reaches, however, whitebark pine is the major species and constitutes the principal cover on many areas. This is indicated from the Vegetation Type survey records for the park which show 10,220 acres of whitebark pine, the largest amount in any timber type in the park.

RIBES

At several places within Grand Teton National Park veritable ribes gardens exist. One of these is in Death Canyon on the lower edge of the Death Canyon-Teeter Ridge areas where the five major ribes species of the park are to be found. These are Ribes petiolare, western black currant; R. inerme, white stemmed gooseberry; R. lacustre, prickly currant; R. montigenum, alpine currant; and R. viscosissimum, sticky currant. Adding two additional species, R. cereum, squaw currant, and R. setosum, bristly gooseberry, that grow in the lower elevations, the total ribes flora for this locality is seven species.

All surveyed areas support some ribes, chief of which are R. viscosissimum, R. montigenum, and R. lacustre. In general these species occur in light to medium populations with heavy patches only occasional.

SURVEY RESULTS

Data for the ten areas surveyed, which are summarized in table 1, are presented in two groups. The first consists of the six trail-side areas and the second, the four front-slope areas. All estimates are for regular funds operated camps.

TABLE 1

SUMMARY OF CONTROL ESTIMATES
FOR GRAND TETON NATIONAL PARK AREAS

Area	Acres	Ribes Per Acre	*Total 8-hr. Man-Days
Glacier Trail	400	75-100	500
Death Canyon-Teeter Ridge	600	100-125**	1,150
Alaska Basin	500	25-50	350
South Fork Cascade Creek	800	50-100	800
North Fork Cascade Creek	450	25-50	300
Paintbrush Canyon-Holly Lake	700	50-75	700
Total Major Areas	3,450		3,800
East Horn	500	25-50	500
Paintbrush to Cascade	700	200-250	1,050
Cascade to Glacier	700	25-50	700
Garnet to Avalanche	450	25-50	450
Total Front-Slope Areas	2,350		2,700
Grand Total	5,800		6,500

*Man-days include only the actual time to be spent on ribes removal.

**Estimate for upland area only. Stream type ribes classed "Heavy".